

phirhynchus has been discovered in the Amou Daria or Oxus by Modest Bogdanoff, and named after the well-known governor of Turkestan, *S. kaufmanni*. This new fish was first described and figured in a Russian work on the Natural History of Khiva, prepared under General Kaufmann's directions some time since, but not yet published—owing, we may well suppose, to General Kaufmann's time being too much taken up with other more important matters. Figures and descriptions of it are given in Prof. Kessler's great work upon the results of the Aralo-Caspian Expedition. The fourth part of this work, published in January, 1877, contains not only full details as to this species, but also of a third Asiatic species of this genus—*S. hermanni*, Severzoff, likewise from the Oxus, without caudal filaments, which, however, is only based upon young examples. As already remarked by Dr. Günther in the note above referred to, the presence in the great Asiatic, as well as in the North American rivers, of this and another peculiar form of the limited group of sturgeons¹ is one of the highest importance in zoological geography. There can be little doubt that species of the genus *Scaphirhynchus* will also be found to occur in the great Chinese rivers, the Yang-tzé-kiang and Ho-ang-ho.

RESPIRATION OF AMIA.—*Amia calva* is a fresh-water fish of the United States. It is abundant in the Mississippi and its tributaries and in the great lakes. It attains a length of about two feet. Mr. Burt G. Wilder has published (*Proceedings of the American Association for the Advancement of Science*, 1877) an account of a series of experiments, which seem very conclusively to show that Amia not only exhales but also inhales air, and that this respiration is carried on by means of its swim (air) bladder. This is so much subdivided, that it will be remembered that Cuvier and others compared it to the lung of some reptiles. Experiments seem to show that the aerial respiration was more active when the water in which the fish lay was imperfectly aerated. The average of twenty-three measurements of the amount exhaled was thirteen cubic centimetres. The exhaled air contained about three per cent. of carbonic acid, and when the fish was fasting it contained at least one per cent. Amia displays great powers of endurance of privation of water. On one occasion a specimen was kept out of water for an hour and five minutes without any apparent discomfort or injury. During most of the time the gill-covers were tightly closed, but there were regular movements of the jaw, hyoid apparatus, and sides of the mouth.

CHILIAN BUTTERFLIES.—We have received a monograph of the butterflies of Chili, by Edwyn C. Reed, printed at the national press at Santiago de Chile. It contains descriptions of some sixty-six species, several of which are described as new, and the monograph is accompanied by three plates. We hope that we may from time to time be able to announce further new contributions to the natural history of this district, so well known by the elaborate "Historia fisica y politica" of Gay.

INSECTS IN TERTIARY ROCKS.—Mr. S. H. Scudder has recently published an account of some very remarkable forms of insects from the tertiary rocks of Colorado and Wyoming. These descriptions form Article xxiv. of the forthcoming vol. iv. of the United States Geological and Geographical Survey. Perhaps the most generally interesting insect described is a fossil butterfly (*Prodryas persephone*), which was found so perfect as to allow of the description even of the scales of the body and wings. It is the first butterfly fossil found in America, and, as only some nine species are known from the well-worked tertiary strata of Europe, it is undoubtedly of

great value and interest. It shows a marked divergence from living types. A beetle is described (*Parolamia rufa*) which is rather of an Old World than of a New World type. A fly (*Palembolus florigerus*) is interesting not only as representing a highly-specialised type hitherto unknown in America, but as showing how the semblance of an original vein may be formed in a wing out of mere fragments of distinct veins. Masses of eggs of a species of *Corydalites* are also described as the first insect eggs found in a fossil state.

ON THE RELATIONS OF RHAEDOPLEURA.—Prof. Allman believes that the very anomalous characters of this curious polyzoan genus (*Rhabdopleura*) admit of being derived from the typical confirmation of a polyzoan, by certain easily understood modifications. One of the most puzzling of those characters is the apparent absence of a tentacular sheath. He maintains that the endocyst is really represented by the contractile cord which seems to take the place of the funiculus in the fresh-water polyzoa, but with which it has nothing to do. In *Rhabdopleura* the endocyst has receded from the ectocyst, and in its posterior part of the approximation of its walls, and the consequent nearly complete obliteration of its cavity has become changed into the contractile cord. Anteriorly, it spreads over the alimentary canal of the polypide, to which it becomes closely adherent, and here represents the tentacular sheath. Still more posteriorly the endocyst undergoes even greater modification, for the contractile cord becomes chitinised and converted into the firm rod which is found running through the stem and branches of the older parts of the colony, and which still presents in its narrow lumen a trace of the original cavity of the endocyst. The shield-like appendage which is attached to the lophophore is one of the most remarkable features in the genus. G. O. Sars regards it as representing the epistome of the Phylactolæmata polyzoa, but this view is entirely opposed by the history of its development. Prof. Allman, by tracing its development in connection with that of the polypide, has arrived at the conclusion that it is formed as a primary bud from the modified endocyst, and that in its turn it gives origin to a bud of the second order, which becomes directly developed into the definite polypide. The primary or scutiform bud continues for some time to increase in size with the developing polypide which it considerably exceeds, but is at last surpassed by the latter. It never disappears, however, but ultimately remains in the condition of a subordinate appendage of the polypide to which it had given origin. We have thus in the life-history of *Rhabdopleura* an alteration of heteromorphic zoids. The first term, however, in the genetic series, the direct product of the sexual system is as yet wanting, no trace of this system having hitherto been discovered in *Rhabdopleura* (Linnean Society of December 19, 1878).

GEOGRAPHICAL NOTES

M. BRAZZA and Dr. Ballay, the two Ogowé explorers, have arrived in Paris. M. Brazza is now preparing a map showing his discoveries in West Africa. It shows that the Ogowé issues from a large chain of mountains, and is formed by a number of rivulets descending from the high regions. The explorers suppose that a large part of the water filling the bed of the Ogowé issues by subterranean infiltrations from the Congo Basin. M. Brazza and Ballay are led to this conclusion by the belief that the Congo is to be found on the other side of the range of mountains mentioned. They were unable to make a direct verification of this assumption, on account of the hostility evinced by the native tribes, who are of the most warlike disposition. It was with the utmost difficulty that the French explorers escaped from the hands of these barbarians, whose war-cries, arms, and canoes present striking resemblances to the ferocious

¹ Of the Sturine genus *Polyodon*, or Shovel-nosed Sturgeons, one, *P. folium*, occurs in the Mississippi, and a second, *P. gladius*, in the Yang-tzé-kiang.

blacks fought by Stanley. The Central Section of the Paris Geographical Society has decided to give to MM. Brazza and Ballay the great gold medal for 1879. Some members proposed to give it to Nordenskjöld, but the prolongation of his voyage, owing to his detention in Behring's Straits, was considered sufficient reason to adjourn Nordenskjöld's claims to 1880.

MANY proposals have been made for a new initial meridian to be adopted by all nations, but no satisfactory solution has yet been reached. The present state of things is very confusing, with nearly as many different initial meridians as there are civilised countries. In *L'Exploration* M. de Beaumont proposes the adoption of a zero passing through Behring's Straits and down the Pacific, its antemeridian passing through the centre of Europe and Africa; but, indeed, any universally-adopted zero would be better than the present confusion.

THE capitalists of Liverpool and Manchester, finding so many of the old markets shut against their enterprise, propose making a railway 500 miles long, from Zanzibar to the south end of Victoria Nyanza, to develop the trade of Central Africa. In the speeches on the subject at Manchester great ignorance was shown of the geography and hydrography of the region in question, and if only a desire to develop the resources of Africa is at the bottom of the movement, it is quite unnecessary to spend a million of money on a railway. With the magnificent water-way explored by Stanley and other travellers, and with the help of either Indian or tamed African elephants, the resources of Central Africa could be quite adequately developed for many years to come.

IN the January number of *Petermann's Mittheilungen* Dr. Gerhard Rohlfs gives the results of his search, during his last journey in the Libyan Desert, for the supposed empty river-bed of the "Bihâr-Bilâ-mâ." He discusses the chief references to this supposed extinct river, and concludes from his researches that there is no warrant for placing its dried-up bed on our maps. The same number contains a fine map of the region about the sources of the Oxus, with short explanatory text by Dr. Behm, and a map of North Siberia, showing Nordenskjöld's track from the Yenessei to the Lena. Accompanying the latter are German translations of the letters of various members of the expedition.

A CONTRACT has been concluded by M. Sibiriakoff, of Irkutsk, in Siberia, with the firm of Kockum, whereby the latter are to build him a steamer of 350 tons burden, for the purpose of going to the assistance of the *Vega*. It is expected that the steamer will be ready soon enough to start, fully equipped with provisions, in time to reach Behring's Straits, by way of the Suez Canal, next August, in order to assist Prof. Nordenskjöld and his companions. The vessel will afterwards trade to the Lena, and, if possible, even to the Yenessei.

AN Italian traveller, Manzoni, made a journey of some importance in Yemen, Arabia, in 1877, the results of which appeared in the *Exploratore*. In June last Manzoni commenced a second journey from Aden northwards to Asir and eastwards to Hadramaut. After visiting several places of interest he arrived in Sana, where, according to last reports, we learn from Dr. Behm's summary, he was ill. This exploration is supported by the Italian *Cosmos*.

THE last number of the *Isveszia* of the Russian Geographical Society contains an important paper by M. Maieff, giving an account of his journey last summer to South Bokhara. M. Maieff describes the various *beckdoms* or subdivisions of Bokhara, their productions, trade, and people, their chief physical features and hydrography. He concludes by some important information on the various routes from Guzar to the Amu Daria and Afghanistan.

A LETTER received from M. Oshanin, from Turkestan, announces that he has just returned from his great journey to Karataghin. He has discovered a very fine glacier, which he has called by the name of the late Fedchenko. This is the third locality bearing the name of the traveller: M. Ujfalvy has called the Lake Kutban-kul "Lake Fedchenko," and M. Maieff has given the same name to one of the peaks of Ghissar.

THE GEOLOGICAL HISTORY OF THE COLORADO RIVER AND PLATEAUS¹

FOR convenience of geological discussion, Prof. Powell has divided that belt of country which lies between Denver and the Pacific, and between the 34th and 43rd parallels, into provinces, each of which, so far as known, possesses structural and topographical features which distinguish it from the others. The easternmost he has named the Park Province. It is characterised by lofty mountain ranges, consisting of granitoid and metamorphic rocks pushed upward and protruded through sedimentary strata, the latter being turned upwards upon the flanks of the ranges and their edges truncated by erosion. The generalised transverse section, on the assumption that the sedimentaries, prior to uplifting, were continuous across the mountains, is that of a broad and extensive anticlinal, sometimes profoundly-faulted parallel to the trend, the sedimentary strata which may once have extended across being removed by erosion. The intervening valleys still retain the entire sedimentary series. This form of mountain structure, with its resulting topographical features, gradually passes, as we go westward, into another type, arising from the decreasing frequency of the greater displacements or differential vertical movements of the earth's surface; but most frequently the dislocation is a combined monoclinal and a fault, or series of faults, with all shades of relative emphasis. The small departure from horizontality amid great general displacement is a strong trait, and justifies the name which has been applied to it by all observers with one accord—the PLATEAU COUNTRY.

West of this province lies a third one—the Great Basin. It is characterised by short, jagged mountain ridges, separated by goodly intervals of barren plains. These ridges are usually produced by the up-lifting of the strata along one side of a fault. Sometimes the faults are multiple, that is, consist of a series of parallel faults, the intervening blocks being careened in the same manner and in the same direction. This repetitive faulting is of very common occurrence. Other modifications, and even different types of structure, are presented; but there is throughout the Great Basin a striking predominance of monoclinal ridges, in which one side of a range slopes with the dip of the strata, and the other side slopes across their upturned edges. The forms impressed upon these masses by erosion are rugged, bristling, and sierra-like, and their peculiarities are aggravated by the fact that before these mountains were brought forth the platform of the country from which they arose had been plicated and the plications planed down by erosion. The Basin is the oldest western land of extensive area. Its final emergence was not later than Jurassic, and may have a still older date.

Between the Plateau and Park Provinces there is no definite boundary. Gradually as we proceed westward from the Parks of Colorado the valleys widen out and expand into a medley of terraces, bounded by cliffs, which stretch their tortuous courses across the land in every direction, yet not without system. The boundary separating the Plateau Province from the Great Basin, on the contrary, is abrupt. In many parts of its extent it seems almost possible to hurl a stone from one province to the

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